INTERACTIVE READING GUIDE: *BUILDING A BETTER BLEACH: A GREEN CHEMISTRY CHALLENGE*

<http://portal.acs.org/portal/PublicWebSite/education/resources/highschool/chemmatters/CTP_005378>

I. Background Knowledge: **On your own**

1. Is color a physical or chemical property? How do you know?
2. Is a color change a physical or chemical change? How do you know?
3. What do you use to get out stains on your clothes? Do you know the chemistry behind it?
4. What is a catalyst? Give an example.
5. Oxidation/Reduction reactions: do you know what happens to the electrons?
6. What is a dioxin? What makes them so dangerous?

II. **Partner A** should lead a discussion going over the background questions.

III. Read the first two paragraphs **on your own**. Then answer the questions below **on your own**. When done individually, **Partner B** should lead the discuss**i**on. **Partner A** should write down any changes that the two conclude.

1. Sentence 4: True or False

The grass stain on my khakis is really still there after I wash them I just can’t see it.

Justify your response by citing the text.

1. Draw a picture of the definition of “bleaching.” Label picture with a caption.

IV. Paragraph 3: **Partner A** read aloud. **Partner B** listen. Reread if necessary. **Partner B**, draw a picture of the oxidation/reduction process on own. **Partner A**, review picture and infer meaning. Explain to **Partner B**. Discuss any discrepancies.

2. **Together**: Go back to background question # 5 and review your individual responses. Re-answer the question **together** drawing upon the knowledge from the article. What do you still not understand?

V. **On own**: Read paragraph four.

1. **Together**: review background questions #1 & 2.

VI. **Together**: Dioxin Caveat

1. **Partner B**, read dioxin caveat on top of page 18 aloud.
2. **Partner A**, lead a discussion about the statements below. **Together**, decide if the statements are true. Justify your responses by citing the text.
3. People can be exposed to dioxins by eating meat and shellfish.
4. Dioxin molecules have chlorine atoms attached to their molecular structure.

3. **Together**: What makes dioxins so dangerous?

VII. Paragraphs 5-8: **Read on own**. While reading, keep the following questions in mind: “How are radicals related to the oxidation/reduction process?” & “Why can hydrogen peroxide be used as a bleaching agent even if it doesn’t have chlorine atoms in its molecule ?” Underline any supporting evidence from the article that helped you answer these questions.

1. When each partner has completed on own, discuss your individual responses.

VIII. Paragraph 9: **Partner** **B**, read aloud. Reread if necessary. **Partner A**, draw a picture defining a catalyst on own. **Partner B** review picture and infer meaning. Explain to **Partner A**. Discuss any discrepancies.

2. **Together**: Go back to background question # 4 and review your individual responses. Re-answer the question together drawing upon the knowledge from the article.

IX. Paragraphs 10-12: read on own.

1. **Together**: create an analogy for each phrase below.
   1. Green chemistry
   2. Catalyst
   3. Bleaching

X. **Together**: Go back to background question # 3 and review your individual responses. Re-answer the question together drawing upon the knowledge from the article. The following terms must be used in the response, IN THE SAME ORDER as seen here: physical property, remove, bleaching, free radical, electron(s), hydrogen peroxide, catalyst. Underline these in your response.